

## CLAIMS

1 1. A network address, comprising:

2 prefix bits encoded to identify the network address as a selected one of a unicast  
3 network address, an anycast network address, and both the unicast and the anycast network  
4 address;

5 anycast scope identifier bits to identify an anycast scope, wherein the anycast scope  
6 corresponds to a network scope within which the anycast network address is recognized; and

7 anycast group identifier bits to identify an anycast group having one or more anycast  
8 members, wherein each of the one or more anycast members is associated with the same  
9 anycast network address.

10  
11 2. The network address of Claim 1, wherein the prefix bits include at least two prefix bits  
12 as the three most significant bits of the network address, and the anycast group identifier bits  
13 include at least thirty-two bits as the least significant bits of the network address.

14  
15 3. The network address of Claim 1, wherein the anycast scope bits include at least two bits  
16 adapted to identify a selected one of a node local scope, a link local scope, a site local scope,  
17 and a global scope.

18  
19 4. The network address of Claim 1, wherein the network address has a network address  
20 length of one hundred twenty eight bits, and the network address is compatible with Internet  
21 protocol version six (IPv6).

22  
23 5. The network address of Claim 4, wherein top level aggregation identifier, next-level  
24 aggregation identifier, and site-level aggregation identifier portions of the one hundred twenty  
25 eight network address bits are at the same bit locations and have the same function for both the  
26 anycast network address and for the unicast network address.

27  
28 6. A network router including one or more routing tables having one or more entries, the  
29 entries comprising:

1           prefix bits encoded to identify the network address as a selected one of a unicast  
2 network address, an anycast network address, and both the unicast and the anycast network  
3 address;

4           anycast scope identifier bits to identify an anycast scope, wherein the anycast scope  
5 corresponds to a network scope within which the anycast network address is recognized; and

6           anycast group identifier bits to identify an anycast group having one or more anycast  
7 members, wherein each of the one or more anycast members is associated with the same  
8 anycast network address.

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10       7.     The network router of Claim 6, wherein the prefix bits include at least two prefix bits as  
11 the three most significant bits of the network address, and the anycast group identifier bits  
12 include at least thirty-two bits as the least significant bits of the network address.

13  
14       8.     The network router of Claim 6, wherein the anycast scope bits include at least two bits  
15 adapted to identify a selected one of a node local scope, a link local scope, a site local scope,  
16 and a global scope.

17  
18       9.     The network router of Claim 6, wherein the network address has a network address  
19 length of one hundred twenty eight bits, and the network address is compatible with Internet  
20 protocol version six (IPv6).

21  
22       10.    The network router of Claim 9, wherein top level aggregation identifier, next-level  
23 aggregation identifier, and site-level aggregation identifier portions of the one hundred twenty  
24 eight network address bits are at the same bit locations and have the same function for both the  
25 anycast network address and for the unicast network address.

26  
27       11.    A method of routing a network packet having a network address, comprising:  
28           receiving the network packet; and  
29           decoding prefix bits associated with the network address to identify the network address  
30 as being a selected one of a unicast network address and an anycast network address.

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2 12. The method of Claim 11, wherein the prefix bits include at least two bits encoded to  
3 indicate a selected one of the unicast network address, the anycast network address, and both  
4 the unicast network address and the anycast network address.

5  
6 13. The method of Claim 11, further including:  
7 performing lookups associated with the network address in one or more routing tables;  
8 identifying an output port from the successive lookups;  
9 sending, if the output port is identified and if the network address is the unicast network  
10 address, the network packet to the identified output port; and  
11 sending, if the output port is identified and if the network address is the anycast network  
12 address, the network packet to the identified output port.

13  
14 14. The method of Claim 13, further including:  
15 if the output port is identified as more than one output port and if the network address is  
16 the anycast network address:  
17 examining port metrics associated with the more than one output port;  
18 identifying one output port from among the more than one output port based  
19 upon the metrics; and  
20 sending the network packet to the identified output port.

21  
22 15. The method of Claim 13, wherein one of the one or more routing tables is associated  
23 with sixteen most significant bits of the network address.

24  
25 16. The method of Claim 13, wherein one of the one or more routing tables is associated  
26 with sixteen most significant bits of the network address and other ones of the one or more  
27 routing tables are associated with respective groups of eight bits of the network address.

28  
29 17. A method of generating a routing table associated with a network packet having a  
30 network address, comprising:

1 receiving the network packet;  
2 decoding prefix bits associated with the network address to identify the network  
3 address as being a selected one of a unicast network address and an anycast network address;  
4 performing lookups associated with selected ones of the bits of the network address in  
5 one or more routing tables to identify a matching route stored in the one or more routing tables;  
6 changing, if the matching route is identified and if the matching route corresponds to the  
7 unicast network address and if the network address is the anycast network address, the prefix  
8 bits associated with the matching route stored in the one or more routing tables to indicate that  
9 the matching route corresponds to both the unicast network address and the anycast network  
10 address; and

11 changing, if the matching route is identified and if the matching route corresponds to an  
12 anycast network address and if the network address is the unicast network address, the prefix  
13 bits associated with the matching route stored in the one or more routing tables to indicate that  
14 the matching route corresponds to both the unicast network address and the anycast network  
15 address.

16  
17 18. The method of Claim 17, wherein the selected ones of the bits of the network address  
18 correspond to sixty-one bits.

19  
20 19. The method of Claim 17, wherein the prefix bits include at least two bits encoded to  
21 indicate a selected one of the unicast network address, the anycast network address, and both  
22 the unicast network address and the anycast network address.

23  
24 20. The method of Claim 17, wherein one of the one or more routing tables is associated  
25 with sixteen most significant bits of the network address.

26  
27 21. The method of Claim 17, wherein one of the one or more routing tables is associated  
28 with sixteen most significant bits of the network address and other ones of the one or more  
29 routing tables are associated with respective groups of eight bits of the network address.

1 22. A computer readable medium having computer readable code thereon for routing a  
2 network packet having a network address, comprising:  
3 instruction for receiving the network packet; and  
4 instructions for decoding prefix bits associated with the network address to identify the  
5 network address as being a selected one of a unicast network address and an anycast network  
6 address.

7  
8 23. The computer readable medium of Claim 22, wherein the prefix bits include at least two  
9 bits encoded to indicate a selected one of the unicast network address, the anycast network  
10 address, and both the unicast network address and the anycast network address.

11  
12 24. The computer readable medium of Claim 22, further including:  
13 instructions for performing lookups associated with the network address in one or more  
14 routing tables;  
15 instructions for identifying an output port from the successive lookups;  
16 instruction for deciding if the output port is identified and if the network address is the  
17 unicast network address, and in response thereto, instructions for sending the network packet to  
18 the identified output port; and  
19 instruction for deciding if the output port is identified and if the network address is the  
20 anycast network address, and in response thereto, instructions for sending the network packet to  
21 the identified output port.

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23 25. The computer programmable medium of Claim 24, further including:  
24 instruction for deciding if the output port is identified as more than one output port and  
25 if the network address is the anycast network address, and in response thereto:  
26 instructions for examining port metrics associated with the more than one output  
27 port,  
28 instructions for identifying one output port from among the more than one  
29 output port based upon the metrics; and  
30 instructions for sending the network packet to the identified output port.

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2 26. The computer readable medium of Claim 24, wherein one of the one or more routing  
3 tables is associated with sixteen most significant bits of the network address.

4  
5 27. The computer readable medium of Claim 24, wherein one of the one or more routing  
6 tables is associated with sixteen most significant bits of the network address and other ones of  
7 the one or more routing tables are associated with respective groups of eight bits of the  
8 network address.

9  
10 28. A computer readable medium having computer readable code thereon for generating a  
11 routing table associated with a network packet having a network address, comprising:  
12 instructions for receiving the network packet;  
13 instructions for decoding prefix bits associated with the network address to identify the  
14 network address as being a selected one of a unicast network address and an anycast network  
15 address;  
16 instructions for performing lookups associated with selected ones of the bits of the  
17 network address in one or more routing tables to identify a matching route stored in the one or  
18 more routing tables;  
19 instructions for deciding if the matching route is identified and if the matching route  
20 corresponds to the unicast network address and if the network address is the anycast network  
21 address, and in response thereto for changing the prefix bits associated with the matching route  
22 stored in the one or more routing tables to indicate that the matching route corresponds to both  
23 the unicast network address and the anycast network address; and  
24 instructions for deciding if the matching route is identified and if the matching route  
25 corresponds to the anycast network address and if the network address is the unicast network  
26 address, and in response thereto for changing the prefix bits associated with the matching route  
27 stored in the one or more routing tables to indicate that the matching route corresponds to both  
28 the unicast network address and the anycast network address.

1 29. The computer readable medium of Claim 28, wherein the selected ones of the bits of  
2 the network address correspond to sixty-one bits.

3  
4 30. The computer readable medium of Claim 28, wherein the prefix bits include at least  
5 two bits encoded to indicate a selected one of the unicast network address, the anycast network  
6 address, and both the unicast network address and the anycast network address.

7  
8 31. The computer readable medium of Claim 28, wherein one of the one or more routing  
9 tables is associated with sixteen most significant bits of the network address.

10  
11 32. The computer readable medium of Claim 28, wherein one of the one or more routing  
12 tables is associated with sixteen most significant bits of the network address and other ones of  
13 the one or more routing tables are associated with respective groups of eight bits of the  
14 network address.